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FACTORS INFLUENCING STOCK PRICES IN CANADA IN THE LONG RUN

by

© Virender Krishna

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE

DEGREE OF MASTER OF BUSINESS ADMINISTRATION

FACULTY OF BUSINESS ADMINISTRATION AND COMMERCE

EDMONTON, ALBERTA

FALL, [illegible]

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Thesis
1968(F)
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UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled FACTORS INFLUENCING STOCK PRICES IN CANADA IN THE LONG RUN submitted by Virender Krishna in partial fulfilment of the requirements for the degree of Master of Business Administration.

ABSTRACT

This thesis examines the influence of gross national product, corporate profits and dividends on stock prices on a long run basis for Canada. It examines the theoretical basis for the selection of the independent variables and reviews several theoretical and empirical studies relevant to stock prices.

The study uses multiple regression equations to determine the influence of each of the independent variables on stock prices. The theoretical aspects of multiple regression are examined together with the assumptions and limitations of multiple regression analysis. The regression model of this study outlines the definitions of the independent variables used in this study.

The study concludes that on a macro economic basis for Canada in the long run, gross national product has a predominant influence on stock prices. Further, any apparent influence of corporate profits and dividends on stock prices is illusory, and due to the influence of gross national product on stock prices on one hand, and corporate profits and dividends on the other.

ACKNOWLEDGEMENTS

The author would like to thank Professor S.P. Singh, who supervised this work, for his frequent advice and encouragement; and also Professors D.H. Bent and K.W. Smillie for a critical reading of the draft and assistance in statistical analysis.

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Chapter I

INTRODUCTION

Since the Second World War, considerable research has been done to analyse the movements of stock prices. However, some of these studies have been of a theoretical nature, and have not been tested empirically. Other studies, while empirical in nature, have confined their analysis to a single causal factor. As some authors have argued whether dividends or earnings influence stock prices, and others have tested the influence of gross national product on stock prices, there is a controversy regarding the determinants of stock prices.[1]

The present study is intended to help identify the important factors which influence stock prices. The objectives of this study are two fold:

(1) To determine the influence of gross national product, corporate profits and dividends on stock prices in Canada, and

(2) To examine if the results of this study, which pertain to Canada, are similar to the results of the studies for the U.S.A.

The present study will be conducted on a macroeconomic basis. Morever, the study is concerned only with the factors influencing stock prices in the long

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[1] As Lintner stated: that these special problems require further attention by the profession is clearly indicated by the fact that there are fundamental differences in the theories offered in the existing literature by eminent and highly reputable authors, regarding the relationship between dividends, earnings, leverage and stock prices.
John Lintner, "Dividends, Earnings, Leverage, Stock Prices and the Supply of Capital to Corporations", Review of Economics and Statistics, Vol. 44, August 1962, pp. 243-269.

run. Therefore, the technical factors internal to the stock market, will be ignored.

In order to determine the influence of gross national product, corporate profits and dividends on stock prices, multiple regression equations will be used. Stock prices will be considered as the dependent variable. Gross national product, corporate profits and dividends will be used as independent variables.

Two time-periods from 1935 to 1966 and 1946 to 1966 will be selected for the study. For the time-period 1935 to 1966, two sets of estimates regarding the influence of gross national product, corporate profits and dividends on stock prices will be made from the data. The first set of estimates will be based on the data in constant dollars, and the second on current prices. For the time-period 1946 to 1966, again two sets of estimates will be made. For the first set, data will be used in constant dollars. For the second set, a new independent variable $GNP^{\prime}$, i.e gross national product minus corporate profits will be used instead of gross national product, as corporate profits are a component of gross national product.

The policy implications of the present study are important. The stock and capital markets are closely related, as the former is an essential source of equity funds. Thus an explanation of the behaviour of stock prices will provide a better understanding of the operations of the capital market. As the stock market is an important source of funds for investment, an understanding of the behaviour of stock prices can help to make fiscal and monetary policies more effective. The importance of stock prices from an investment viewpoint may be seen from the total traded value of stocks. In 1966, the total volume of trading amounted to 1,606 million shares,

with a total trading value of $3,389 million.[2] This latter figure represented approximately 67 per cent of total corporation profits before taxes and 120 per cent of total corporation profits after taxes, in Canada.[3] Finally, the findings of the study should help to evaluate stock price predictions made by institutions and other investors interested in Canadian investments.

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[2] Canadian Almanac and Directory, 1968, p. 226.

[3] The magnitude of the value of stocks held by Americans is seen in the fact that in 1963 it equalled the gross national product of the U.S.A., which reached $600 billion in that year.
D. Seligman and T.A. Wise, "New Forces in the Stock Market", Fortune, Vol. LXIX, No. 2 (February 1964).

Chapter II

THEORETICAL FRAMEWORK OF THE STUDY

This chapter will discuss the theoretical implications of the three variables chosen to analyze the behaviour of stock prices. The first part of the chapter will examine the influence of gross national product on stock prices, the findings of similar studies, and their implications. The second part will discuss the controversy regarding the relative influence of dividends and earnings on stock prices, and hypothesis for the present study.

Gross National Product

The hazard in evaluating the stock market arises partly from the difficulty in determining the importance of the factors that influence stock prices. One such factor is the gross national product.[1] GNP is defined as "... the total current value of final output of goods and services produced by residents of a country during a given period of time ..."[2] The adjective 'final' refers to the ultimate use of goods and eliminates counting the value of a good more than once in a myriad of transactions.[3] Thus, GNP is a measure of aggregate economic activity.

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[1] Hereinafter referred to in this paper as GNP.

[2] Gilbert W. Cooke, The Stock Markets (New York: Simmons-Boardman Publishing Corporation, 1964), p. 365.

[3] The final figure includes corporate profits before taxes, wages, salaries, rent, interest, miscellaneous investment income, farm income, income from unincorporated businesses, indirect taxes, capital consumption allowances and various valuation adjustments.

GNP influences stock prices in two ways. Firstly, inflationary pressure is reflected in GNP figures when reported at current prices. The inflationary pressure is also reflected in stock prices if reported on a current dollar basis. However, these changes in stock prices are not due to any improvement in the level of economic activity, but merely reflect a rising price level in the economy. As Cooke states:

> A residual equity instrument such as common stock, has a tendency to rise in value with the increase in dollar dividends per share to compensate for the change on consumer prices.[4]

Secondly, GNP influences stock prices because of a fundamental relationship between the two variables, apart from inflationary pressure.

In examining the influence of GNP on stock prices, any movement due to inflationary pressure on both the variables is of no concern to this paper. Instead, the relationship that exists between both the variables, when they have been reduced to constant dollars is of primary concern. An illustration of the extent of inflationary pressure may be seen in the fact that out of the 55 per cent increase in GNP for Canada between the years 1961 and 1966, only 35 per cent is attributed to real growth.[5] The remaining 20 per cent is accounted by the inflationary

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[4] Cooke, Stock Markets, p. 363.

[5] Economic Council of Canada, Fourth Annual Review: The Canadian Economy from the 1960's to the 1970's. (Ottawa: The Queen's Printers, 1967), p. 13.

pressure in the economy.

GNP figures for the U.S.A. from 1929 to 1962 are shown in Appendix A, Table 1. Contractions in economic activity are evident for the years 1949, 1954 and 1958. It is apparent from the changes in GNP that the economy has shown a phase of expansion followed by a phase of contraction. There is also increasing evidence that expansions and contractions of business activity have an effect upon stock prices. Bratt has suggested that stock prices tend to reach a trough several months in lead of the trough in business cycles, because they reflect the expectations of major stock owners, who possess an understanding of business conditions.[7]

The movement of stock prices is not a continuous upward or downward trend. An examination of the behaviour of stock prices for different time periods indicate that there are short term, intermediate and long term cycles. As early as 1900, Charles H. Dow rote:

---

6. Accompanying the price increases, but distinct from it, a substantial rise in industrial production occurred since the end of World War II. In Canada, between the years 1946 and 1965, the Index of Industrial Production rose from 84 to 255. The indexes of durable manufactures rose from 80 to 237, non-durable manufactures from 90 to 224 and utilities from 79 to 448, when measured in constant (1949) dollars. Dominion Bureau of Statistics, Annual Supplement to the Monthly Index of Industrial Production (Ottawa: The Queen's Printers, May 1966), p. 9.

7. Elmer Bratt, Business Cycles and Forecasting, (5th ed., Homewood, Illinois: Richard D. Irwin, 1961), p. 385.

> The market is always to be considered as having three movements, all going on at the same time. The first is the narrow movement from day to day. The second is the short swing running from two weeks to a month or more; the third is the main movement covering at least four years in its duration.[8]

The "main movement" in stock prices is primarily influenced by the economic conditions of a nation, and GNP is an important yardstick of economic conditions. The authors of the Dow theory only intended to describe a pattern of stock price movements which would predict general business cycles. It appears that the Dow Jones Industrial Averages leads economic activity. The years 1929, 1937, 1953, 1957 and 1960 may be cited as examples when stock prices led the slowdown in economic activity.

In the present paper, it is postulated that in the long run, GNP influences stock prices, after making necessary adjustments for changes in the price level.[9] In a study similar to the present one, Weston examined the long term relationship between stock prices and aggregate economic activity for the U.S.A. and found that both were closely related.[10]

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[8] National Observer, June 10, 1962, p. 10. Excerpt taken from a lead article on Mr. Dow.

[9] It may also be contended that GNP is dependent on the level of stock prices, through a circuitous route. For if stock prices are high, it will encourage equity financing for expansion and research projects, thereby stimulating the national economy. However, this indirect interdependence is ignored here, and only the primary relationship examined.

[10] J. Fred Weston, "The Stock Market in Perspective", Harvard Business Review, 1956, pp 71-80.

The influence of GNP on stock prices flows through a series of interconnecting links. GNP influences corporate sales; corporate sales influence corporate profits and dividends which finally influence stock prices. Weston ignored the intermediate links and empirically examined only the relationship between the first and last links of the chain, vis. GNP and stock prices.[11]

To examine the relationship between the above mentioned variables, Weston developed a regression equation with stock prices as the dependent variable, and GNP as the independent variable. For the time period 1909 to 1940 (excluding the period 1928 to 1932 which was considered unusual), the following estimates of the parameters of the regression equation were obtained:

$$SP = 15.58 + .7468\ GNP$$

where, SP is stock prices represented by Standard and Poor's Industrial Index with 1935-1939=100, and GNP represents aggregate economic activity measured in 1953 prices. For a longer time period of 1868 to 1928, the parameters of the regression equation were estimated as:

$$SP = 14.23 + .7488\ GNP$$

Weston averaged the coefficients of the two equations and stated the relationship between stock prices and aggregate economic activity as:

$$SP = 15 + .75\ GNP$$

This equation indicates that the level of stock prices, as measured by Standard

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[11] J. Fred Weston, "The Stock Market in Perspective", Harvard Business Review, 1956, pp. 71-80.

and Poor's Industrial Index is approximately 0.75 times the current level of GNP, plus a constant of approximately 15 index points. In order to test the predictive power of the equation, Weston estimated the level of 1955 stock prices with the equation, and found that the equation accounted for 90% of the actual value of Standard and Poor's Industrial Index.

It may be emphasized that the study pertained to the general level of stock prices and not to any individual company or industry. The study also revealed cyclical patterns in stock prices with a general upward trend, confirming the earlier observations.

A similar empirical study for the U.S.A. was done by Solomon.[12] He computed the ratio of the rate of economic growth, as indicated by GNP, and the rate of increase in stock prices for the time period 1879 to 1883 and 1909 to 1913 after adjusting for changes in the price level. He called this a "normal ratio". By multiplying the rate of economic growth for a year by the "normal ratio", Solomon determined the rate of increase in stock prices, that was warranted for that particular year. He found that for the time period 1874 to 1955 actual growth in stock prices had proceeded at about two-thirds the rate of growth in real GNP.

While Solomon's results were in keeping with those found by Weston for the U.S.A., the "normal ratio" technique when applied to Australia produced "implausible results". Using a "normal ratio" for Australia, Lamberton found

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12. Ezra Solomon, "Economic Growth and Common Stock Values", Journal of Business, XXVIII, July 1955, pp. 213-221.

that since 1938, actual stock prices were below the warranted level.[13] Lamberton suggested that a variety of economic policy measures in the Australian economy such as tax rates, interest rates, price controls, stock issue controls, tariffs, and foreign exchange restrictions might have produced such a different relationship between stock prices and GNP. He further observed that the "normal ratio" was developed on pre-inflation age prices.

The above studies sought a single causal factor for explaining stock price movements. However, it is important that the influence of other factors on stock prices, such as corporate profits and dividends, should also be considered. The development of a multiple regression equation using three independent variables may increase the predictive power of the equation. Therefore, the equation for the present study intends to examine the nature of the relationship that exists between the dependent variable, viz. stock prices and the three independent variables, GNP, corporate profits, and dividends.

In addition to explaining the relationship between the above variables, the equation may also be used for predictive purposes by inserting estimates for the independent variables. For example, if a forecast of 1969's stock prices is required, the estimates for GNP, corporate profits and dividends for 1969 should be applied to their respective coefficients. This should provide an estimate of stock prices for 1969.

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13. D.McL. Lamberton, "Economic Growth and Stock Prices - The Australian Experience", Journal of Business, July 1958, pp. 200-212.

Earnings and Dividends

Earlier in the chapter, it was mentioned that GNP was a comprehensive measure of aggregate economic activity. The figure for GNP includes corporate earnings before taxes. However, corporate earnings and dividends are of such importance in their own right, that their influence upon stock prices warrants separate analysis. Authors on stock price valuation are divided into two main groups, viz. the fiscal theorists and the financial analysts. Each group is further subdivided into two major schools of thought.

Fiscal Theorists

The theory of valuation of future income streams occupies a central place in economic theory. Fiscal theorists are divided into two groups - pure earnings and dividend. The "pure earnings" group contends that stock prices, *ceteris paribus*, are a function of corporate earnings. This group includes Durand, the Lutzes, Solomon, Roberts, Kuh, Dean, Weston, and most important of all, Modigliani and Miller.[14] The last mentioned authors concluded:

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[14] David Durand, "Costs of Debt and Equity Funds for Business: Trends and Problems of Measurement", Conference on Research in Business Finance, New York, 1952; Frederick Lutz and Vera Lutz, *The Theory of Investment of the Firm* (Princeton, 1951); Ezra Solomon, "Measuring a Company's Cost of Capital", *Journal of Business*, Vol. XXVIII October, 1955; Harry V. Roberts, "Current Problems in the Economics of Capital Budgeting", *Journal of Business*, Vol. XXX, January 1957; Edwin Kuh, "Capital Theory and Capital Budgeting", *Metroeconomica*, Vol. XII, August-December 1960; Joel Dean, *Capital Budgeting* (New York: 1951); J. Fred Weston, "The Management of Corporate Capital: A Review Article", *Journal of Business*, Vol. XXXIV, April 1961; Franco Modigliani and Merton H. Miller, "Dividend Policy, Growth and the Valuation of Shares", *Journal of Business*, Vol. XXXIV, October 1961.

> ... given a firm's investment policy, the dividend payout policy it chooses to follow will affect neither the current price of its shares nor the total return to its shareholders.[15]

Modigliani and Miller discussed four different methods of stock valuation. These were (a) Discounted cash flow approach, (b) Current earnings plus future investment opportunities approach, (c) Stream of dividends approach and (d) Stream of earnings approach. They concluded:

> the various formulas can be shown to be equivalent in all essential respects, including, of course, their implication that dividend policy is irrelevant.[16]

The considered it immaterial to an investor whether or not he received any dividends. The effect of not receiving a dividend would be an increase in the market price of the stock. The investor might then sell that proportion of his stock which he would otherwise have received as a cash dividend.

Gordon accepted the above conclusions of Modigliani and Miller under their assumption of a certain future.[17] However, he did not agree with their contention that even under conditions of uncertainty, the above conclusions would hold. Two arguments were put forward by Gordon against Modigliani and Miller's viewpoints. Firstly, he disputed whether an investor would be indifferent between future share price appreciation and current dividends. Under conditions of uncertainty, stock price appreciation was uncertain, whereas cur-

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[15] Ibid

[16] Ibid

[17] M.J. Gordon, "Optimal Investment and Financing Policy", The Journal of Finance, Vol. XVIII, No. 2, May 1963, pp. 264-272.

rent dividends were certain. Secondly, the assumption of a constant discount rate by Modigliani and Miller was a moot point. Generally, investors have an aversion to risk and uncertainty. Given a particular level of risk for a corporation, it appears reasonable that a change in the discount rate will occur as a result of a change in the dividend policy of a firm. The uncertainty of a dividend will increase with time in the future, and the discount rate will not be independent of the time period in which the dividend is paid. As uncertainty is a characteristic of investment markets, Gordon's objection appears valid.

As against the "pure earnings" group, the "dividend group" argues that stock prices are, ceteris paribus, a function of dividends.[18] They contend that stock prices reflect the present value of expected dividends. Walter, a leading proponent of this view, argued that assuming a given level of retained earnings, the rate of return on additional investment determined the magnitude of future dividends.[19] The expected dividends, discounted at the appropriate capitalization rate, determined the present value of a stock.

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[18] This group includes: James Walter, "Dividend Policies and Common Stock Prices," The Journal of Finance, Vol. XI, March 1956; Myron J. Gordon, "Dividends, Earnings and Stock Prices," The Review of Economics and Statistics, Vol. XLI, May 1959; Myron J. Gordon and Eli Shapiro, "Capital Equipment Analysis: The Required Rate of Profit", Management Science, Vol. III, October 1956; Harold Bierman, Jr., Lawrence Fouraker, and Robert Jaedicke, Quantitative Analysis for Business Decisions, 1961.

[19] Walter," Dividend Policies".

Further, if the rate of return is high, the capitalization rate will tend to be low, and future dividends will tend to be discounted at a low rate. Therefore, if the rate of return on additional investment is sufficiently high, low dividend payout ratios may add to stock prices, as the dividends are discounted at a low rate. The present value of a stock can be computed with the help of the following formula, which is often used for stock valuation and shows the importance of dividends:

$$Vc = \frac{D + \frac{Ra}{Rc}(E-D)}{Rc}$$

where, Vc = present value of stock,

D = cash dividends paid,

E = earnings ,

Ra = rate of return on additional investment, and

Rc = market capitalization rate. It should be noted that the function (E-D) is assumed to be constant.

On the basis of the above equation, the price of a stock (Vc) will increase under the following four conditions:

(i) Rate of return on additional investment increases (Ra),

(ii) Market capitalization rate decreases (Rc),

(iii) Earnings increase (E),

(iv) Cash dividends increase (D).

As long as Ra is greater than Rc, retention of earnings will benefit shareholders.

Fiscal theorists also suggest a close relationship between retained earnings and stock values. An important source of capital gain is corporate savings and its investment for business expansion. The "plowing back" of corporate profits increases the value of corporate capital accounts and the value of corporate securities.[20]

The "pure earnings" and the "dividends" groups represent two extremes of a spectrum of viewpoints. In between these extremes, other theorists accept the influence of both earnings and dividends. Van Cleave and Clendenin suggest that under "normal conditions" the stock market values a stock at approximately the sum of the present values of all expected future dividends discounted at a rate commensurate with risk.[21] However, this technique is very difficult to apply. First, it is almost impossible to estimate precisely the future dividends of a firm. Second, a capitalization rate is required for discounting the expected flow of dividends. In order to circumvent these problems, the authors suggest an approximate method of computation. They suggest a figure of 20 as a "normal rate" for multiplying dividends, and 14 for multiplying earnings. These multipliers increase if the prospects of the firm are good and decrease if prospects are not good. The authors, thus, recognize the influence of both dividends and earnings on stock prices, although they make no statement on the relative importance of each variable.

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[20] U.S. Treasury Department, Tax Advisory Staff of the Secretary, Federal Income Tax Treatment of Capital Gains and Losses, (Washington, D.C., 1951), pp. 15-16.

[21] Maurice Van Cleave and John C. Clendenin, "Growth and Common Stock Values," The Journal of Finance, December 1954, p. 365.

The two problems concerning estimation of future dividends and earnings, and a market capitalization rate are encountered in the works of most of the fiscal theorists. Further, the traditional approach of fiscal theorists assumed a rational capital market, perfect competition and perfect knowledge. The last assumption, as it relates to discounting future dividends or earnings, is exceedingly difficult to satisfy.

Financial Analysts

Among the financial analysts there are two important theories of stock prices, conventional and confidence. Although there are differences between the two groups, they recognize the importance of both corporate earnings and dividends. The proponents of the conventional theory believe that the basic cause of stock price movement is the anticipation of a change in corporate earnings.[22] On the other hand, the proponents of the confidence theory of stock prices state:

> the basic factor in the movement of stock prices is the rise and fall of trader and investor confidence in the future of stock prices, earnings and dividends.[23]

Thus, both the groups recognize the influence of corporate earnings and dividends on stock prices, although the confidence theory places greater emphasis on market psychology than on the expected increase or decrease in earnings and dividends. As Cooke states:

> There is considerable evidence that a strong correlation exists between stock prices and corporate earnings or dividends...generally, stock prices increase

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[22] George L. Leffler and Loring C. Farwell, The Stock Market (3rd Ed., New York: The Ronald Press Company, 1963), p. 493.

[23] Ibid.

with increases in corporate profits.[24]

The conventional theory of stock prices considers earnings as the most important factor influencing stock prices. Traders and investors buy and sell stocks largely on the basis of anticipated earnings. As a result, stock prices are believed to have been discounted for expected changes in earnings. A theoretical defence may be provided for the above premise. Generally, stocks are bought for two main purposes: (1) appreciation and (2) yield. A rise in earnings causes an appreciation in the value of the stock. The yield of a stock is determined by the amount of dividends paid and the market price of the stock.

The conventional theory ranks dividends as next in importance to earnings, in determination of stock prices. Stock yields provide a good yardstick for evaluating the stock market at any point in time. At the peak of every bull market from 1929 to 1962, stock yields were close to 3 per cent. At the trough of every bear market for the same period, stock yields approximated 7 to 10 per cent. Similarly, price-earnings ratios tend to be very high at the peak of bull markets and very low at the trough of bear markets.

The importance of both corporate earnings and dividends may be seen from the various formula timing plans developed to evaluate stocks. "Normal value formula timing plans", attempt to value a stock on earnings, dividends and yields. One such plan is the "Two-Signal Intrinsic Value Formula" developed by Leffler.[25] The plan classifies stocks into the following three groups:

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[24] Cooke, Stock Markets, p. 346

[25] Benjamin Graham and D.L. Dodd, Security Analysis, (3rd Ed., New York: McGraw Hill Book Co., 1951) pp 432-433.

(1) Stocks are valued very high if they have a yield of 4 per cent and a price-earnings ratio of 18;

(2) Stock values are normal if the yield is 5 per cent and the price-earnings ratio is 14.5;

(3) Stocks are valued low if they have a yield of 6 per cent and a price-earnings ratio of 11.[26]

The above yields and price-earnings ratios have been computed on the basis of corporations included in the Dow Jones Industrial Average.

Another such plan is the Graham Earnings-Yield Formula, developed by Benjamin Graham.[27] It is based on the concept of a central value computed from the Dow Jones Industrial Average of stock prices and the yield on high grade bonds (Aaa). The central value is computed by capitalizing the average earnings of a corporation for the past ten years, at a capitalization rate equivalent to twice the yield on high grade bonds. Stocks are purchased when the Dow Jones Industrial Average falls to 80 per cent of this central value and are sold when the average rises to 120 per cent of the central value.

Financial analysts have placed considerable emphasis on the importance of

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[26] It should be noted that the stock market has undergone considerable structural change in the level of price-earnings ratios since the advent of this formula plan. With the emergence of the conglomerate movement, price-earnings ratios considerably in excess of those mentioned above, are no longer considered unusual.

[27] Benjamin Graham, The Intelligent Investor (New York: Harper and Row, Publishers, 1949), p. 264.

earnings and dividends in the evaluation of stock prices.[28] However, they have not been enthusiastic in recognizing the effects of retained earnings on stock prices. As Leffler and Farwell state:

> Even in growth stocks there is surely no clear indication that a low dividend in relation to earnings is regarded by the stock market as a possible advantage. It is merely overlooked. The considered and continuous verdict of the stock market is overwhelmingly in favour of liberal dividends as against niggardly ones. . . The outside, or public stockholder gets no tangible, realizable benefits from his investment except by way of dividends received thereon or through and in market price. The latter in turn is usually dependent on the former.[29]

As discussed above, there is a serious controversy about the relative influence of earnings and dividends on stock prices. Fiscal theorists and financial analysts are divided amongst themselves on the subject. In the present study, it is suggested that both corporate earnings and dividends play an important role in determining stock prices. Several reasons may be put forward to support this position. First, corporate earnings indicate the profitability of a company. They represent the

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[28] Another intrinsic value formula was developed by Edgar Genstein. Edgar S. Genstein, Stock Market Profit Without Forecasting (South Orange, J.N.: Investment Research Press, 1954) p. 40. In this case, the central value is a self adjusting median, based on a normal price-dividend ratio. Three preliminary figures from the Dow Jones Industrial Average are necessary: (1) The average price for the past ten years (p) (2) The average dividends for the past ten years (d) and (3) Current dividends (D).

The central value is computed from the following formula:

$$\frac{\bar{p}}{\bar{d}} . D$$

Stocks are purchased when they fall to 80 per cent of this central value and sold when they rise to 125 per cent.

[29] Leffler, Farwell, The Stock Market, p. 569

"opportunity cost" to an investor, by permitting him to compare the return on his investment to the possible return on other investments. Secondly, for those investors primarily interested in the yield of their investments, dividends reflect the distribution of these earnings to stockholders. Third, the diversity of composition of investors at any particular point of time is such that some segment of the market is dividend oriented, while others are earnings oriented.[30] In dealing with aggregative economic indexes, the sentiments of a cross section of the investors must be taken into account.

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[30] It is suggested that the larger, conservative institutions such as some pension, trust and endowment funds are relatively concerned with dividend payout ratios and bond yields, whereas the more aggressive mutual funds may concentrate on earnings records and reinvestment policies of growth companies and industries.

Chapter III

METHODOLOGY

This chapter outlines the methodology used to determine the influence of GNP, corporate profits and dividends on stock prices. The study involved the use of regression analysis, to develop an equation which would explain stock price movements. The chapter is divided into two parts. The first part discusses the general nature of regression analysis. The second part discusses the nature of the variables, sources of data, and the validity of the assumptions of regression analysis to the data of the present study.

Regression Analysis

Regression analysis is used to estimate the closeness with which two or more variables are associated, and to measure the change in the dependent variable caused by the independent variables. In the case of a simple linear regression, the relationship between the dependent and independent variable may be expressed by the following equation:

$$Y = a + bX + U$$

where, a is a constant term and represents the intercept, b is the unknown true regression coefficient of the independent variable X and represents the slope of the regression line, U is a random term used to explain the variance of Y from the exact linear dependence on X, and Y is the dependent variable.

The inclusion of U in the regression equation is required by the fact that only one variable out of many, is used in explaining the dependence of Y. Further,

most economic data contain some errors of measurement. Such errors may arise because totals of economic data are estimated on a sample basis; even if a complete enumeration is attempted, errors of measurement and statistical computation often occur. Thus, the net effect of the excluded variables plus errors of measurement and other random variations are represented by U.

In the case of multiple regression, more than one independent variable is used to explain the dependence of y. The multiple regression equation also has a random term for the same reasons as simple regression. In this case, the linear relationship between the dependent and independent variables may be expressed by the following equation:

$$Y = a + b_1X_1 + b_2X_2 + --- b_kXk + U$$

Because of certain assumptions, it is important to realize the limitations of the results obtained through the use of regression analysis. First, in order to estimate the coefficients of the regression equation, it is assumed that a linear relationship exists between the dependent and independent variables in the sample data. Further, if a straight line is fitted to sample data in order to estimate the relationship of the population, then the latter relationship, i.e. of the population, must also be linear.

Second, there is a uniform scatter or dispersion of the values of X about the regression line. This property known as homoscedasticity, means that the random variable u has a constant variance. Thus the standard deviation of the residuals is constant for all values of the independent variable.

Third, the residuals are assumed to be independent of each other, and therefore are not related to their prior values. When the residuals are related to one another, it is known as autocorrelation. Even in the presence of autocorrelation, the estimates of the coefficients are unbiased, but they are not the best estimates, i.e. the variance is not minimum.[1]

Fourth, the distribution of the residual values (U's) is normal, and their mean or expected value is zero. If this assumption is satisfied, probability statements may be made regarding the confidence with which the values obtained from the equation are interpreted.

If the above mentioned conditions are satisfied, the coefficients of the linear regression equation, and the standard error of estimate computed from asample are efficient, linear and unbiased estimates of the true population values.[2] However, it is imperative, while using the equation for predictive purposes, that the economic conditions in the extrapolated period remain similar to those on which the estimates of the coefficients were based.

If the independent variables of the regression equation are highly correlated, it is known as multicolinearity. Multicolinearity causes the individual regression coefficients to be unreliable. Johnston has stated the following regarding the unreliability of the individual regression coefficients in the presence of multi-

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1. K.W. Smillie, An Introduction to Regression and Correlation, (Toronto: The Ryerson Press, 1966), p. 96.

2. J. Johnston, Econometric Methods (New York: McGraw Hill Book Company, 1963), p. 201.

colinearity:

> When some or all of the explanatory variables in a relation are so highly correlated one with another that it becomes very difficult, if not impossible, to disentangle their separate influences and obtain a reasonably precise estimate of their relative effects.[3]

However, the predictive power of the total equation is not affected.

The accuracy of the predicted value of the dependent variable depends upon the size of the standard error of estimate, the coefficient of determination (R^2) and randomness of the residual term. However, interpretation must be cautious when estimating a value of y using a value of X outside the observed values of X. It is important that the nature of the relationship between the dependent variable and the independent variables that existed in the past, will continue in the future. It is necessary to choose independent variables which are logically related to the dependent variable.

Regression Model for the Study

In the present study, regression analysis will be used to estimate the relative and total influence of GNP, aggregate corporate profits and aggregate dividends on stock prices. Therefore, stock prices are the dependent variable and GNP, corporate profits and dividends are the independent variables. Further, the study is conducted on a macroeconomic basis for Canada, covering the time-period 1935 to 1966.

Operational Definition of Variables

Stock Price Average - Stock prices are represented by an index of stock

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[3] Ibid.

sample of Canadian stocks listed on the Toronto, Montreal and Canadian stock exchanges.[4] The number of stocks included for each company is in proportion to the total number of stocks outstanding. The Dominion Bureau of Statistics compiles the index on the basis of Thursday's closing quotations as reported in the Globe and Mail and the Montreal Gazette. A weekly, monthly, quarterly and annual index is computed. The list is a representative sample of stocks. The number of companies included in the index has fluctuated between 110 and 120. At the end of 1968, the index included 114 companies.[5] The current list of stocks and weights are shown in Appendix A, Table 2.

The index for the years 1935 to 1959 is prepared on a base year of 1935-39 = 100, and for the years 1960 to 1966 on a base year of 1956=100. The figures for the stock price average are shown in Appendix A, Table 3. The stock price average is converted to a single base year of 1949=100, and is shown in Appendix A, Table 8.

GNP - The figure for GNP includes consumer, private and government expenditures, and net foreign investment. The figures for GNP for the years 1935 to 1966 are recorded in constant (1949=100) dollars, and are shown in AppendixA, Table 4. Since GNP includes corporate profits, and the latter is an independent variable in the equation, a new figure, GNP', is computed and used under certain

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[4] Dominion Bureau of Statistics, Prices and Price Indexes, (Ottawa: The Queen's Printers, February 1969), p. 41.

[5] Ibid.

conditions to see if the results are improved. GNP' is the total GNP minus corporate profits before taxes. The figures for GNP are shown in Appendix A, Table 5.

Corporate Profits - Corporate profits represent the aggregate corporate profits before taxes, as reported by the Dominion Bureau of Statistics. The original figures are recorded on a current dollar basis, for the years 1935 to 1966. The figures are shown in Appendix A, Table 6. The figures for corporate profits are converted to constant dollars using the Wholesale Price Index with 1935-39=100. The converted figures are shown in Appendix A, Table 9.

Corporate Dividends - Corporate dividends figures include amounts paid to both residents and non-residents of Canada on an annual basis. The original figures for the years 1935 to 1966, as reported by the Dominion Bureau of Statistics, are recorded on a current dollar basis and are shown in Appendix A, Table 7. The corporate dividends figures are converted to constant dollars with 1935-39=100, and are presented in Appendix A, Table 10.

Tests of the Assumptions of Regression Analysis

Test of Linearity - The assumption of a linear relationship between each independent variable and the dependent variable in the present study was tested graphically. Figures 1, 2 and 3 are scatter diagrams plotting the stock price average with GNP, corporate profits and dividends, respectively. In the first case, the points lie around a straight line, except for the years 1935 to 1945. Similarly, in the second case, the points scatter around a straight line, except for the years

FIGURE 1

STOCK PRICE AVERAGE AND GNP

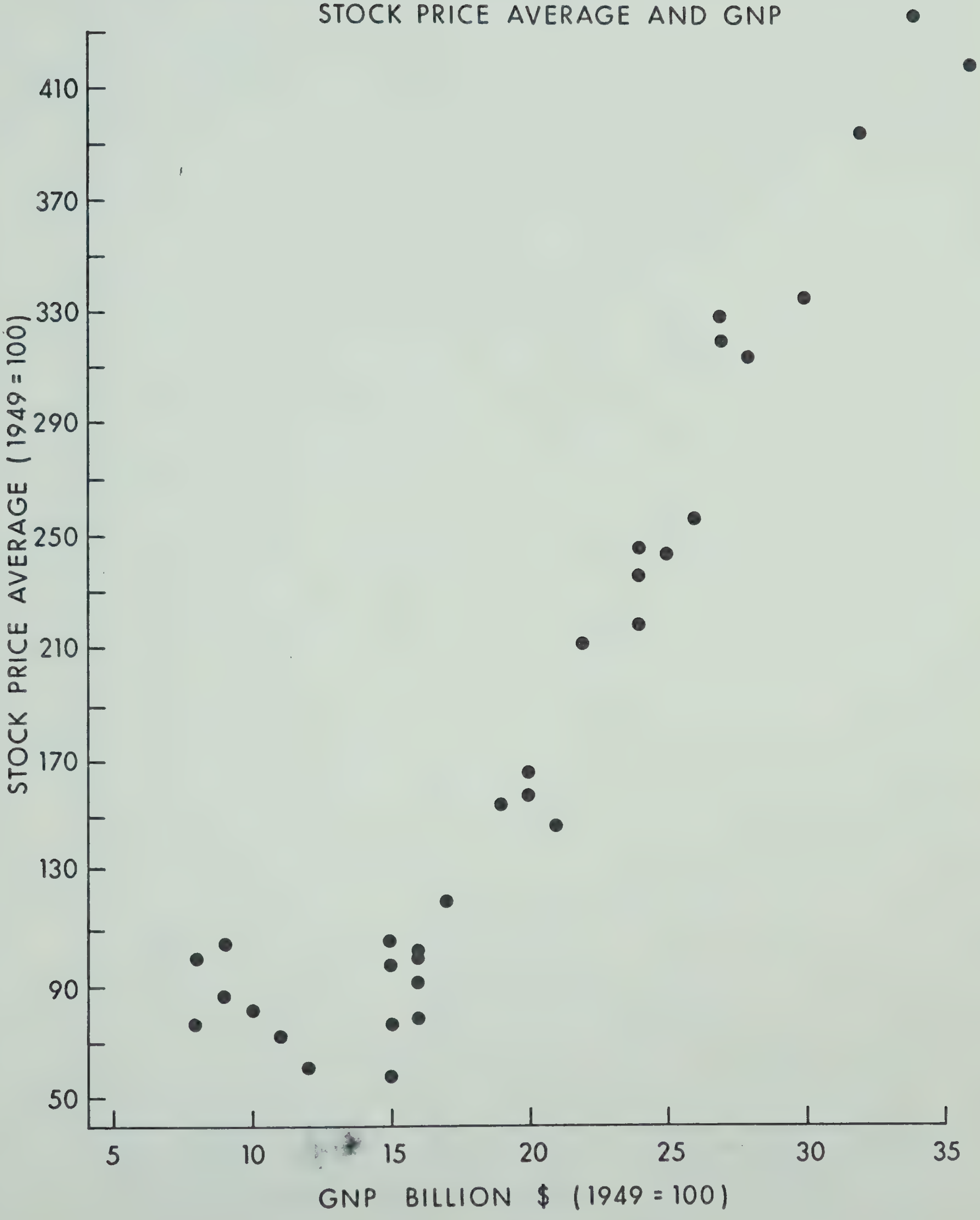


FIGURE 2
STOCK PRICE AVERAGE AND CORPORATE PROFITS

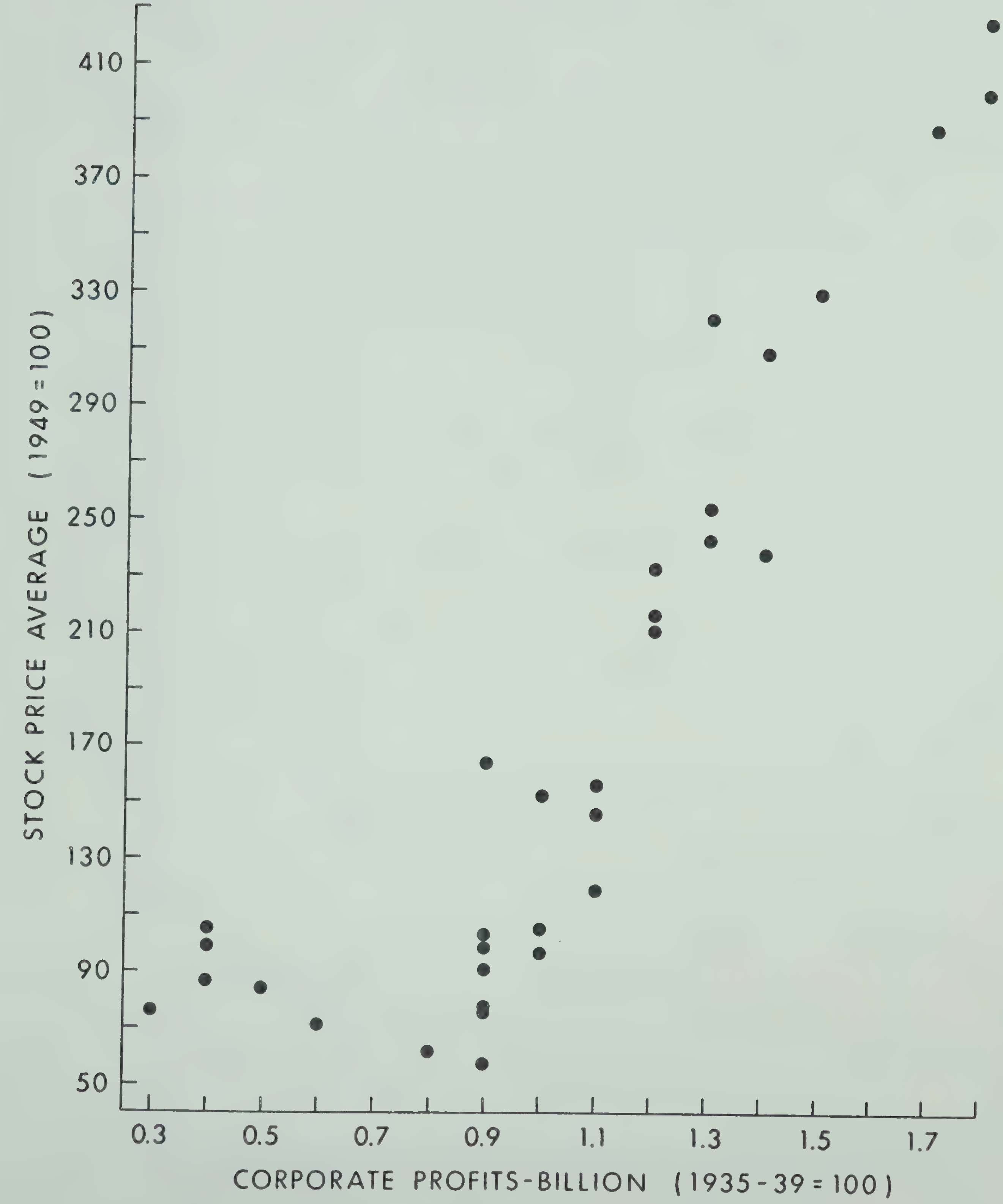
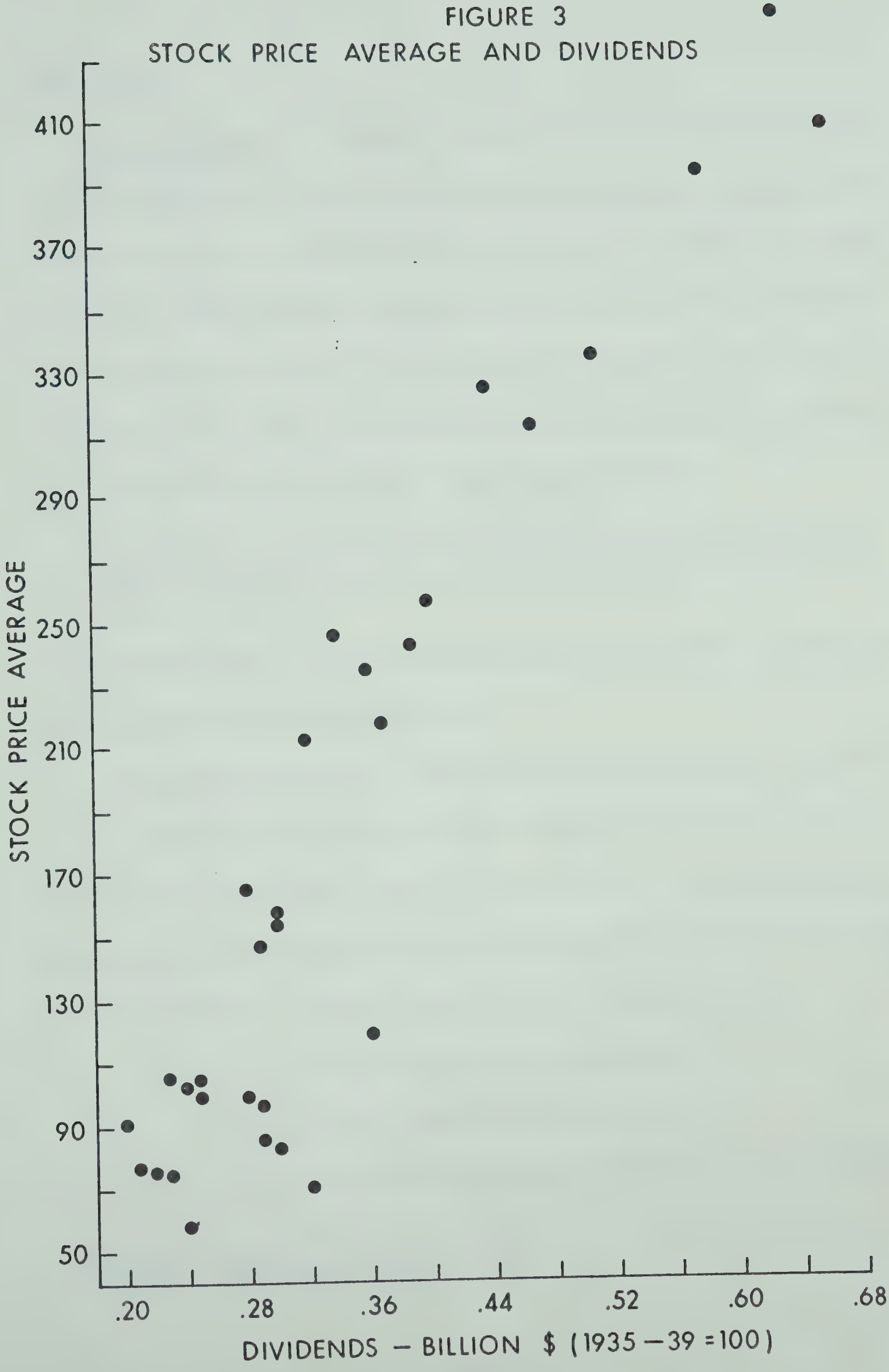


FIGURE 3

STOCK PRICE AVERAGE AND DIVIDENDS



1935 to 1945.

Test of Colinearity - The three independent variables used in the present study were tested for colinearity, and were found to be highly correlated. The correlation values are presented in the following chapter. However, it needs to be emphasized that although colinearity may effect the reliability of the individual regression coefficients, it will not alter the predictive power of the total regression equation. This interdependence between the independent variables is not a serious problem for forecasting. As Johnston has stated:

> If forecasting is a primary objective, then intercorrelation of explanatory variables may not be too serious, provided it may reasonably be expected to continue in the future.[5]

It appears reasonable to assume that the intercorrelation of GNP, corporate profits and dividends will continue in the future.

Test of Auto correlation - Test of auto correlation is of great importance in economic studies involving time series data. One well known test for auto correlation is the Durbin-Watson statistic, represented by d. Lower (d_L) and upper (d_U) bounds for this statistic at the 1% and 5% levels of significance may be found in published tables. The test is conducted in the following manner:

H_1 : There is no positive auto correlation.

H_2 : There is positive auto correlation.

When (1) the computed value of d is less than d_L , the d is significant and the

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6. Johnston, Econometric Methods, p. 207

alternative hypothesis is accepted; (2) the computed value of d is greater than dU, the d is not significant and the null hypothesis is accepted; (3) when the computed value of d is greater than d_L, but less than d_U, the test is inconclusive. The test for negative auto correlation is similar to that for positive auto correlation, except that the statistic 4-d is used instead of the statistic d. Several regression equations were developed, and each of them was tested for auto correlation; the result of each test is presented in the following chapter.

The calculations for this study were performed by computer. The particular system used was the IBM 360/67 available in the Computing Centre at the University of Alberta.

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7. The particular programs used were SPSS (Statistical Package for the Social Sciences) and CS007 of the Computing Centre, University of Alberta.

Chapter IV

ANALYSIS

This chapter discusses the results obtained through multiple regression equations that were developed to examine the influence of GNP, corporate profits and dividends on stock prices. The chapter is divided into two parts. The first part deals with the equations relative to the time-period 1935 to 1966. The second part is concerned with the equations developed for the time period 1946 to 1966.

Time Period 1935 - 1966

As mentioned earlier, the present study is concerned with the long run movements of stock prices. For this reason, the time-period 1935 to 1966 was selected, providing a thirty year time span. There were two principal reasons for not extending the time period any further. First, the years between 1929 and 1934 are considered unusual because of the Great Depression. The stock market conditions prevailing during the years prior to 1929 were very different from those subsequent to 1935. Second, the data for the years prior to 1929 were not easily accessible.

The present section discusses two regression equations. The first equation deals with the data in constant dollars. The importance of using constant dollars has been emphasized earlier. The second equation uses current dollars in order to observe if there is any improvement in the results.

Regression Equation with Variables in Constant Dollars

The estimates for the coefficients of a regression equation were obtained for the time period 1935 to 1966, using constant dollars. An equation of the following type was developed:

$$Y = a + b_1 \;_1 + b_2X_2 + b_3X3 + U$$

where,

Y = stock price average,

X_1 = GNP,

X_2= corporate profits before taxes,

X_3= dividends paid.

The data are presented in Table 1. The variables were introduced into the regression equation in order of significance. The following values for the regression equation were obtained:

$$Y^1 = -111.70 + .43X_3 + .02X_1 - .15X_2$$
$$(5.67) \quad (5.19) \quad (-3.00)$$

The figures in brackets below the regression coefficients indicate the t- values of the coefficients.

TABLE 1

STOCK PRICE AVERAGE, GNP, CORPORATE PROFITS BEFORE TAXES AND DIVIDENDS FOR THE TIME-PERIOD 1935-1966 IN CONSTANT DOLLARS

YEAR	STOCK PRICE AVERAGE[1] 1949=100	GNP[2] 1949=100 (Millions of dollars)	CORPORATE PROFITS BEFORE TAXES[3] 1935-39=100 (Millions of dollars)	DIVIDENDS PAID[4] 1935-39=100 (Millions of dollars)
1935	76.4	7678	269	216
1936	99.5	8022	351	251
1937	105.9	8820	403	250
1938	86.7	8871	362	290
1939	83.7	9536	541	304
1940	70.7	10911	619	317
1941	61.7	12486	801	273
1942	58.7	14816	917	243
1943	76.3	15357	882	233
1944	76.6	15927	858	211
1945	91.0	15552	852	195
1946	105.8	15251	966	230
1947	96.8	15446	1008	286

Table - 1 (Continued)

YEAR	STOCK PRICE AVERAGE 1949=100	GNP 1949=100 (Millions of Dollars)	CORPORATE PROFITS BEFORE TAXES 1935-39=100 (Millions of Dollars)	DIVIDENDS PAID 1935-39=100 (Millions of Dollars)
1948	102.8	15735	908	240
1949	100.0	16343	851	278
1950	120.3	17471	1065	361
1951	153.8	18547	1034	300
1952	158.2	20027	1081	296
1953	146.5	20794	1089	287
1954	165.6	20186	953	282
1955	212.7	21920	1206	321
1956	245.9	23811	1313	340
1957	236.0	24117	1202	364
1958	218.8	24397	1242	371
1959	242.6	25242	1378	388
1960	256.9	25849	1295	397
1961	326.1	26515	1314	436
1962	314.4	28287	1422	470
1963	336.0	29740	1525	511
1964	394.0	31650	1718	583
1965	433.1	33814	1836	629
1966	408.5	35822	1762	655

The change in the value of R^2 is presented below, when X_1 and X_2 are successively added, after the correlation value between X_3 and Y is computed:

X_3 — 87.7 per cent

X_1 — 6.4 per cent

X_2 — 1.4 per cent

Thus, X_3 explains 87.7 per cent of the total variance. The introduction of variable X_1 adds 6.4 per cent to the explained variance, and X_2 adds 1.4 per cent. It is important to note that the 6.4 per cent contributed by X_1 to the explained variance, does not imply that X_1 if left alone in the equation will contribute only 6.4 per cent. Instead, X_1 taking into account the effect of X_3 already in the equation, adds an additional 6.4 per cent to the explained variance. In a similar manner X_2 contributes 1.4 per cent to the total explained variance, The standard error of estimate is 24.66 index points. The t- values for X_1, X_2 and X_3 indicate that the coefficients of these variables are significant at the 1 per cent level.

The total variation in y explained by the independent variables in the above equation is 95.5 per cent. A standard error of estimate of 24.66 index points implies that the actual stock price average in the future will lie within a range of 49 index points from the predicted value, and the probability of this event occurring is 95 per cent. However, the direction of change predicted by the coefficient for X_2 (corporate profits before taxes) is theoretically injustifiable.

As mentioned in the preceding chapter, tests of inter correlation indicated

a high degree of colinearity between the independent variables. The values of correlation coefficients of GNP and corporate profits, and GNP and dividends, were .976 and .864 respectively.The correlation coefficient of dividends and corporate profits was .823. As a result of a very high correlation between the independent variables, the estimates of the individual regression coefficients are unreliable. Therefore, it is difficult to draw conclusions regarding the relative influence of GNP, corporate profits and dividends on stock prices.

However, as forecasting is the primary objective of the present study, the problem of multi colinearity does not impose serious limitations on the results of the study, as it is expected to continue in the future. It is reasonable to assume that GNP, corporate profits and dividends will continue to be highly correlated.

In order to test for the presence of auto correlation in the residuals, the Durbin-Watson statistic was computed. The computed value of the Durbin-Watson statistic was 1.40. At 1 per cent level of significance, the lower and upper bounds for this statistic for a sample of thirty-two observations and three independent variables are 1.04 and 1.43 respectively. As the computed value is greater than the upper bound, there is no positive auto cor relation in the residuals at the 1 per cent level of significance.

In order to evaluate the significance of the equation, the F-ratio was computed. The F-ratio represents the ratio of the explained variance to the

unexplained variance adjusted for the degrees of freedom lost. The F-ratio is computed from the analysis-of-variance table given below:

TABLE 2

ANALYSIS OF VARIANCE TABLE FOR STOCK PRICE AVERAGE FOR THE TIME PERIOD 1935-1966 IN CONSTANT DOLLARS

SOURCE	Degrees of Freedom	Sum of Squares	Mean Squares	F-Ratio
REGRESSION	3	369904.375	123301.437	202.6
ERROR	28	17040.500	608.589	
TOTAL	31	386944.875		

The F-Ratio of 202.60 is significant at the per cent level.

Regression Equation with Variables in Current Dollars

The coefficients for a regression equation similar to the one above were estimated for the same time period (1935-1966) but in current prices. (Table 3). The purpose of this equation was to see if the use of current prices might eliminate the negative sign of the coefficient for corporate profits, and reduce the size of the standard error of estimate. The estimates of the equation are shown below:

$$Y' = 18.25 + .007X_1 - .053X_2 + .143X_3$$

$$(4.18) \qquad (-2.89) \qquad (2.96)$$

where Y', X_1, X_2 and X_3 are the same variables as in the previous equation, but

in current prices. The figures in brackets indicate the t-values for the coefficients.

The percentage of total variation in stock prices explained by each of the three independent variables, as measured by the change in R_2 is as follows:

X_1 — 93.6 per cent

X_3 — 0.9 per cent

X2 — 1.2 per cent

Hence, the variable X_1, accounted for 93.6 per cent of variation in stock prices by itself.

TABLE 3

STOCK PRICE AVERAGE, GNP, CORPORATE PROFITS BEFORE TAXES AND DIVIDENDS IN CURRENT DOLLARS FOR THE TIME PERIOD 1935-1966

YEAR	Stock Price Averages [1] 1949=100	GNP [2] (Millions of Dollars)	Corporate Profits Before Taxes [3] (Millions of Dollars)	Dividends Paid [4] (Millions of Dollars)
1935	76.4	4315	254	204
1936	99.5	4653	340	243
1937	105.9	5257	434	269
1938	86.7	5278	370	296
1939	83.7	5636	537	302
1940	70.7	6743	669	342
1941	61.7	8328	932	318
1942	58.7	10327	1128	299

Table 3 (Continued)

YEAR	Stock Prive Averages[1] 1949=100	GNP [2] (Millions of Dollars)	Corporate Profits before Taxes [3] (Millions of Dollars)	Dividends Paid [4] (Millions of Dollars)
1943	76.3	11088	1128	298
1944	76.6	11850	1120	276
1945	91.0	11835	1125	257
1946	105.8	11850	1342	320
1947	96.8	13165	1646	467
1948	102.8	15120	1757	465
1949	100.0	16343	1688	551
1950	120.3	18006	2250	762
1951	153.8	21170	2484	720
1952	158.2	23995	2442	669
1953	146.5	25020	2404	634
1954	165.6	24871	2069	611
1955	212.7	27132	2640	702
1956	245.9	30585	2963	767
1957	236.0	31909	2734	829
1958	218.8	32894	2829	846
1959	242.6	34915	3178	894
1960	256.9	36287	2990	917
1961	326.1	37471	3066	1018
1962	314.4	40575	3413	1128
1963	336.0	43424	3730	1251
1964	394.0	47393	4215	1430
1965	433.1	52098	4597	1576
1966	408.5	57738	4575	1700

Source:
1. Table A-8 (Appendix)
2. Dominion Bureau of Statistics, Canada Year Book (Ottawa: The Queen's Printers, 1965 and 1968)
3. Table A-6 (Appendix)
4. Table A-7 (Appendix)

The insertion of X_3 into the equation added 0.9 per cent to the explained variance, taking into account the influence of X_1. Similarly, X_2 contributed 1.2 per cent, taking into account the influence of variables X_1 and X_3 already in the equation. The total variation explained by all the explanatory variables is 95.8 per cent. The standard error of estimate is 23.96 points of the stock price average. The t-values for X_1, X_2 and X_3 indicate that the coefficients of these variables are significant at the 1 per cent level.

The computed value of the Durbin-Watson statistic was 1.37. This indicates the presence of positive auto correlation at the 1 per cent level of significance. However, as the regression equation did not either reduce the standard error of estimate substantially, or elimiate the negative sign of the coefficient for corporate profits, no attempt was made to remove the auto correlation.

The significance of the equation was tested by the F-ratio, presented in Table 4 below:

TABLE 4

ANALYSIS OF VARIANCE TABLE FOR STOCK PRICE AVERAGE FOR THE TIME PERIOD 1935 - 1966 AT CURRENT PRICES

source	Degrees of Freedom	Sum of Squares	Mean Squares	F-ratio
REGRESSION	3	370865.562	123621.812	215.27
ERROR	28	16079.312	574.260	
TOTAL	31	386944.874		

The F-ratio is significant at the 1 per cent level. The above equation failed to achieve its objective of providing a theoretically justifiable direction of change for the variable X_2 (corporate profits before taxes).

Time Period 1946 - 1966

In order to eliminate the negative sign of the coefficient for corporate profits and reduce the size of the standard error of estimate, another equation was developed for the time period 1946 to 1966. When time series data are used in regression analysis, it is desirable that the data for years in which abnormal variations occurred, be excluded. As Leabo noted:

> The inclusion of one or two extreme items can change the aggregate relationship of a group of paired values from a large r to a small r, and vice versa.[1]

The time period 1935 to 1945 is considered abnormal for this study as it includes the period immediately succeeding the long depression and the period of the Second World War.

The following estimates for the coefficients of the regression equation were obtained from the data in Table 5:

$$Y^1 = -192.45 + .012X_1 + .091X_2 + .031X_3$$
$$(4.29) \qquad (1.29) \qquad (.23)$$

where Y^1, X_1, X_2 and X_3 are the same variables as in the previous equations.

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[1] Dick A. Leabo, Basic Statistics, (Homewood, Illinois: Richard D. Irwin, Inc., 1968), p. 376.

TABLE 5

STOCK PRICE AVERAGE, GNP, CORPORATE PROFITS BEFORE TAXES AND DIVIDENDS FOR THE TIME PERIOD 1946-1966 IN CONSTANT DOLLARS

YEAR	Stock Price Averages 1949=100	GNP 1949=100 (Millions of Dollars)	Corporate Profits Before Taxes 1935-39=100 (Millions of Dollars)	Dividends 1935-39=100 (Millions of Dollars)
1946	105.8	15251	966	230
1947	96.8	15446	1008	286
1948	102.8	15735	908	240
1949	100.0	16343	851	278
1950	120.3	17471	1065	361
1951	153.8	18547	1034	300
1952	158.2	20027	1081	296
1953	146.5	20794	1089	287
1954	165.6	20186	953	282
1955	212.7	21920	1206	321
1956	245.9	23811	1313	340
1957	236.0	24117	1202	364
1958	218.8	24397	1242	371
1959	242.6	25242	1378	388
1960	256.9	25849	1295	397
1961	326.1	26515	1314	436
1962	314.4	28287	1422	470
1963	336.0	29740	1525	511
1964	394.0	31650	1718	583
1965	433.1	33814	1836	629

Source: Table 1

The figures in brackets below the regression coefficients indicate the t-values of the coefficients.

The percentage of variation in stock price averages explained by the three independent variables is as follows:

X_1 — 96.50 per cent

X_2 — 0.40 per cent

X_3 — 0.01 per cent

The total variation explained by the independent variables is 97.0 per cent. The variables X_2 and X_3 contributed 0.40 and 0.01 per cent respectively, after accounting for the influence of X_1. The standard error of estimate is 19.84 index points.

The computed value of the Durbin-Watson statistic was 1.80. At the 1 per cent level of significance, the lower and upper bounds for this statistic for a sample of twenty-one observations and three independent variables are 0.80 and 1.41, respectively. At the 5 per cent level of significance, the lower and upper bounds are 1.03 and 1.67, respectively. Therefore, the test shows that there is no positive auto correlation in the residuals.

The t-value for X_1 indicates that the coefficient is significant at the 1 per cent level. The t-values for X_2 and X_3 indicate that the coefficients are not significant at the 1 per cent level.

To evaluate the significance of the equation, the F-ratio was computed and

is presented in Table 6 below:

TABLE 6

ANALYSIS OF VARIANCE TABLE FOR STOCK PRICE AVERAGE FOR THE TIME PERIOD 1946-1966 IN CONSTANT DOLLARS

SOURCE	Degrees of Freedom	Sum of Squares	Mean Squares	F-Ratio
REGRESSION	3	222722.125	74240.687	188.537
ERROR	17	6694.125	393.771	
TOTAL	20	229416.250		

The F-ratio is significant at the 1 per cent level.

Thus, the results of the equation for the time period 1946 to 1966 have improved from the results for the time period 1935 to 1966. The size of the explained variance of the dependent variable increased from 95.5 per cent to 97.0 per cent. At the same time, the standard error of estimate decreased from 24.66 to 19.84 points of the stock price average. Therefore, the predictive power of the equation improved despite a reduction in the number of observations.

However, the problem of multicolinearity remained in the above equation. The presence of colinearity is indicated by a high correlation between GNP and corporate profits with a value of r = .96; and between GNP and dividends with a value of r = .95. Dividends are also highly correlated with corporate profits with

a value of r=.96.

The results indicate that out of the three independent variables, GNP, corporate profits and dividends, the influence of GNP on stock price is predominant. This is theoretically justifiable. As outlined in Chapter II, GNP is an indication of aggregate economic activity. It is a composite figure including corporate profits, wages and salaries, etc. The level of corporate profits is in turn dependent on the aggregate sales and expenses of corporations. Hence, it is logical to infer that the level of stock prices will be dependent on the level of economic activity as indicated by composite figures such as GNP. Thus, circumventing the interconnecting links between stock prices and GNP, viz. corporate sales, corporate profits and dividends, the influence of GNP on stock prices is constant with economic theory. The level of corporate profits is dependent on the level of GNP. Dividends are dependent on corporate profits and in recent years have levelled at approximately 35 per cent of corporate profits. Therefore, the influence of GNP is felt indirectly on dividends also. Perhaps it is impossible to find corporate profits and dividends increasing when GNP is declining. Hence, once the impact of GNP is isolated from the total influence of the independent variables on stock prices in a multiple regression equation, the influence of the remaining variables, corporate profits and dividends, is bound to be minimal.

The above contention is corroborated by the results obtained from the simple regression equations with each of the three independent variables individually.

The estimates for the coefficients of the simple regression equations are presented below:

$$Y = -176.29 + .017 X_1$$
$$(23.18)$$

$$Y = -228.84 + .366 X_2$$
$$(16.44)$$

$$Y = -86.24 + .820 X_3$$

$$(13.02)$$

where, Y, X_1, X_2 and X_3 are the same as in previous equations, and the figures in brackets represent the computed t-values of the regression coefficients. The t-values of X_1, X_2 and X_3 are all significant at the 1 per cent level.

While the variables X_2 and X_3 appear to influence the dependent variable significantly, it is suggested that this influence is actually the result of the influence of GNP on corporate profits and dividends. Firstly, GNP positively influences stock prices, and secondly, it also influences corporate profits and dividends. Therefore, association between stock prices, and corporate profits and dividends as found in the simple regression equations, is purely due to the influence of GNP on stock prices, on the one hand, and corporate profits and dividends on the other. Hence, although corporate profits and dividends are significant in simple regression, they become insignificant in multiple regression. However, these comments pertain only to a macroeconomic analysis regarding factors influencing stock prices in Canada.

It should be noted that when the independent variables were introduced into the regression equation in order of contribution to the explanation of the variance of the dependent variable, using a stepwise regression program, GNP was selected first and explained 96.50 per cent of the variation in stock price averages.

As corporate profits before taxes are a component of GNP, a regression equation was developed using GNP', i.e. GNP minus corporate profits before taxes, and the remaining two independent variables. It may be noted that dividends are also a component of corporate profits. However, it was not removed from corporate profits, as was done in the case of corporate profits from GNP. If dividends are subtracted from corporate profits, the resulting figure is retained earnings. The inclusion of retained earnings as an independent variable may not be theoretically justifiable, as many important writers have argued that retained earnings do not influence stock prices.[2]

The following coefficients of the equation were estimated from the data in Table 7:

$$Y^1 = - 192.44 + .012X_4 + .104X_2 + .031X_3$$

$$(4.29) \qquad (1.50) \qquad (\ .23)$$

---

[2] An equation using retained earnings as an independent variable was developed. The results, however, were not significant.

TABLE 7

STOCK PRICE AVERAGE, GNP , CORPORATE PROFITS BEFORE TAXES AND DIVIDENDS FOR THE TIME PERIOD 1946-1966 IN CONSTANT DOLLARS

YEAR	Stock Price Averages[1] 1949=100	GNP[2] 1949=100 (Millions of Dollars)	Corporate Profits Before Taxes[3] 1935-39=100 (Millions of Dollars)	Dividends Paid[4] 1935-39=100 (Millions of Dollars)
1946	105.8	14285	966	230
1947	96.8	14438	1008	286
1948	102.8	14827	908	240
1949	100.0	15492	851	278
1950	120.3	16406	1065	361
1951	153.8	17513	1034	300
1952	158.2	18946	1081	296
1953	146.5	19705	1089	287
1954	165.6	19233	953	282
1955	212.7	20714	1206	321
1956	245.9	22498	1313	340
1957	236.0	22915	1202	364
1958	218.8	23155	1242	371
1959	242.6	23864	1378	388
1960	256.9	24554	1295	397
1961	326.1	25201	1314	436
1962	314.4	26865	1422	470
1963	336.0	28215	1525	511
1964	394.0	29932	1718	583
1965	433.1	31978	1836	629
1966	408.5	34060	1762	655

Source: 1. Table A-8 (Appendix)
2. Table A-5 (Appendix)
3. Table A-9 (Appendix)
4. Table A-10 (Appendix)

where, X_2 = corporate profits before taxes,

X_3 = dividends paid,

X_4 = GNP .

The bracketed figures represent the t-values of the regression coefficients.

The percentage of variation in the stock price average explained by the three independent variables is as follows:

X_4 — 96.30 per cent

X_2 — 0.60 per cent

X_3 — 0.01 per cent

The total variation explained by the independent variables is 97.0 per cent and the standard error of estimate is 19.84 index points.

The computed value of the Durbin-Watson statistic was 1.80. At the 1 per cent level of significance, the lower and upper bounds for this statistic for a sample of twenty-one observations and three independent variables are 0.80 and 1.41, respectively. Hence, there was no positive serial correlation at the 1 per cent level of significance.

The t-value for X_4 indicates that the regression coefficient is significant at the 1 per cent level. However, the t-values for X_2 and X_3 remain insignificant at the 1 per cent level. The F-ratio of 188.54 continues to be significant at the 1 per cent level, as in the previous equations.

The substitution of X_1 (GNP) with X_4 (GNP') did not remove the problem of multicolinearity. The r values of GNP' with corporate profits and dividends were .961 and .948 respectively. The r value for dividends and corporate profits was .961. The predictive power of this equation was not enhanced as the standard error did not decrease. The explained variance of the dependent variable remained 97.0 per cent. As corporate profits represent approximately 5 per cent of GNP, the absence of improvement in the equation is not surprising.

Once again, the simple regression equation with GNP' (X_4) indicated that the regression coefficient was significant at the 1 per cent level. The following values for the coefficients of the simple regression equation were estimated:

$$Y^1 = - 172.25 + \underset{(22.53)}{.018\,X_4}$$

The estimates for the simple regression equations with X_2 and X_3 remained the same as before. The validity of the previous interpretation of the results of simple regression equations is further established by these results.

As the inclusion of X_3 in the regression equation contributes 0.009 per cent to the coefficient of determination (R_2), and increases the standard error of estimate by 0.53 index points, it was removed from the equation. The estimates of the regression equation with the remaining two independent variables are provided below:

$$Y = - 196.42 + \underset{(4.73)}{.013\,X_1} + \underset{(2.04)}{.114\,X_2}$$

where, X_1 and X_2 represent GNP' and corporate profits, respectively.

The coefficient of determination (R_2) remained at 97.0 per cent and the standard error of estimate decreased to 19.31 index points. The computed value of the Durbin-Watson statistic was 1.80 and indicated no serial correlation at the 1 per cent level of significance. The F-value of the equation increased to 298.56, which is significant at the 1 per cent level. The t-value of the coefficient for X_2 remains insignificant.

If the above equation is used for predictive purposes, a probability statement with 95 per cent confidence would require a range of 76 index points. It may appear that a range of 76 index points, when the current stock price average is in the vicinity of 430, is excessive. Perhaps the standard error of estimate is large for short term prediction, for example, one year. However, over a long period, a range of 76 index points is not excessive. Nevertheless, caution should be exercised in making long term predictions. As was mentioned earlier, extrapolations beyond the period of the observed data are made on the assumption that the conditions known to exist for the observed period will continue in the future. This assumption becomes difficult to fulfil, if the period for which the prediction is made extends into the distant future.

As the use of GNP in lieu of GNP did not improve the equation, and the latter is an indicator of aggregate economic activity, the equation finally adopted is presented below:

$$Y = -196.42 + .013\,X_1 + .100\,X_2$$
$$(4.73) \qquad (1.73)$$

where, Y, X_1 and X_2 represent stock prices, GNP and corporate profits before taxes, respectively.

Chapter V

SUMMARY AND CONCLUSIONS

Summary

This study was undertaken to examine the influence of gross national product, corporate profits and dividends on stock prices. The study was conducted on a macro basis for Canada. Further, the analysis examined the influences on stock prices in the long run.

The technique used to measure the influence of GNP, corporate profits and dividends on stock prices was multiple regression analysis. Four regression equations were developed. The first two equations estimated the influence of the independent variables for the time-period 1935 to 1966, both in constant and current prices. The last two equations estimated the influence of the variables for the time-period 1946 to 1966, using in one case GNP as a variable in conjunction with corporate profits and dividends, and in the other GNP' in lieu of GNP.

Conclusions

The results of the study revealed that GNP had a predominant influence on stock prices in Canada. On a macro basis, corporate earnings and dividends do significantly influence stock prices. This finding is consistent with economic theory once the inter-relationships among the variables are analysed. Corporate profits are dependent upon the level of economic activity and prosperity of an economy. This economic prosperity is reflected in GNP. Hence GNP is a yardstick of economic activity, with corporate profits contributing to that economic activity. It is

important to emphasize that the influence of GNP on corporate profits is not due to the fact that the latter is a component of the former. In fact, corporate profits contribute less than 10 per cent to GNP. Rather the influence of GNP on corporate profits is indirect. GNP reflects the economic strength of a country and will tend to be positively associated with corporate profits.

The influence of GNP on dividends is similarly indirect. Dividends are dependent on the level of corporate profits, and tend to represent a fairly consistent percentage of corporate profits. In recent years the payout ratio of dividends to corporate profits has levelled at approximately 35 per cent. Since corporate profits are dependent on the economic prosperity of the country, and dividends are directly related to profits, the influence of GNP on dividends is established.

Although each of the independent variables were significantly related to stock prices in simple regression analysis, this influence of corporate earnings and dividends on stock prices is due to the influence of GNP on stock prices on the one hand and corporate profits and dividends on the other. Hence, corporate profits and dividends do not influence stock prices individually, if the influence of GNP is taken into account. This becomes apparent when through the use of multiple regression, the total influence on stock prices is partitioned. This kind of approach to the movements of stock prices has not been taken in the past. The results of simple regression analysis are misleading as the influence of GNP on stock prices is mistaken for the influence of corporate profits and dividends on stock

prices. Multiple regression analysis reveals this fallacy.

The size of the standard error estimated in the present study limits the use of the findings of the study for predictive purposes. They should be used only for intermediate term, i.e. approximately five years, predictions. Any predictions for the short run will be less meaningful, as the actual value will lie within a range of 76 index points from the forecast level, at the 95 per cent level of confidence. A range of 76 index points appears to be too broad for short term predictions. For any period longer than five years, economic conditions could change significantly. However, when used for intermediate term predictions, the equation should provide valuable information.

SELECTED BIBLIOGRAPHY

Clendenin, John C., and VanCleave, Maurice. "Growth and Common Stock Values." Journal of Finance, (December 1954).

Cooke, Gilbert W. The Stock Markets. New York: Simmons-Boardman Publishing Corporation, 1964.

Ezekiel, M. and Fox, K.A. Methods of Correlation and Regression Analysis. New York: John Wiley and Sons, Inc., 1959.

Gordon, Myron J. "Optimal Investment and Financing Policy". Journal of Finance, (May 1963).

Graham, Benjamin. The Intelligent Investor. New York: Harper and Row, Publishers, 1949.

Graham, Benjamin, and Dodd, D.L. Security Analysis. New York: McGraw Hill Book Co., 1951.

Hoel, P.G. Elementary Statistics. New York: John Wiley and Sons, Inc., 1966.

Johnston, J. Econometric Methods. New York: McGraw Hill Book Co., 1963.

Lamberton, D. McL. "Economic Growth and Stock Prices - The Australian Experience." Journal of Business, (July 1958)

Leabo, Dick A. Basic Statistics. Homewood, Illinois: Richard D. Irwin, Inc., 1968.

Leffler, George L. and Farwell, Loring C. The Stock Market. New York: B.C. Forbes and Co., 1963.

Modigliani, Franco and Miller, Merton. "Dividend Policy, Growth and the Valuation of Shares". Journal of Business (October 1961).

Smillie, K.W. An Introduction to Regression and Correlation. Toronto: The Ryerson Press, 1966.

Smillie, N. Consumption Forecasts - Agricultural Products. Unpublished M.B.A. Thesis; University of Alberta, May 1968.

Solomon, Exra. "Economic Growth and Common Stock Values". Journal of Business, (July 1955).

Spurr, William A. and Bonini, Charles P. Statistical Analysis for Business Decisions. Homewood, Illinois: Richard D. Irwin, Inc., 1967.

Walter, James. "Dividend Policies and Common Stock Prices". Journal of Finance, (March 1956).

Weston, J. Fred. "The Stock Market in Perspective". Harvard Business Review, (1956).

Yamane, Taro. Statistics. An Introductory Analysis. New York: Harper and Row Publishers, 1967.

APPENDIX A

ADDITIONAL DATA

TABLE A-1

AGGREGATIVE CHANGES IN GROSS NATIONAL PRODUCT FOR THE TIME PERIOD 1929-1962

YEAR	GNP
1929	104.4
1930	91.1
1931	76.3
1932	58.5
1933	56.0
1934	65.0
1935	72.5
1936	82.7
1937	90.8
1938	85.2
1939	91.1
1940	100.6
1941	125.8
1942	159.1
1943	192.5
1944	211.4
1945	213.6
1946	210.7
1947	234.3
1948	259.4
1949	258.1
1950	284.6
1951	329.0
1952	347.0
1953	365.4
1954	363.1
1955	397.5
1956	419.2
1957	440.3
1958	444.5
1959	482.7
1960	503.4
1961	518.7
1962	554.9

Source: U.S. Income and Output, pp. 126-7; 1957-1961, Survey of Current Business July 1962, p. 6, July 1963, p. 12.

TABLE A-2

LIST OF STOCKS AND WEIGHTS IN STOCK PRICE AVERAGE AT DECEMBER 1968

Total Industrials (80)

Industrial Mines - (4)

Cominco Ltd.	1669
Falconbridge Nickel Mines Ltd.	491
International Nickel Co. of Canada Ltd., The	7439
Noranda Mines Ltd.	2388

Foods - (10)

Atlantic Sugar Refineries Co. Ltd.	546
Burns Foods Ltd.	80
Canada Malting Co. Ltd.	86
Canada Packers Ltd.	600
Canadian Canners Ltd. "A"	109
Laura Secord Candy Shops Ltd. New	115
Maple Leaf Mills Ltd.	160
Salada Foods Ltd.	265
Silverwood Dairies Ltd. "A"	90
George Weston Ltd. "A"	1091

Beverages - (7)

Canadian Breweries Ltd.	2176
H. Corby Distillery Ltd. voting	99
Crush International Ltd.	411
Distillers Corporation - Seagrams Ltd.	1754
John Labatt Ltd.	871
Molson Breweries Ltd. "A"	606
Walker - Gooderham and Worts Ltd. Hiram	1738

Textiles and Clothing - (5)

Cosmos Imperial Mills Ltd.	40
Domco Industries Ltd.	76
Dominion Textile Co. Ltd.	260
Harding Carpets Ltd.	53
Montex Apparel Industries Ltd. New	116

Table A-2 (Continued)

Pulp and Paper - (7)

Abitibi Paper Co. Ltd.	1786
B.C. Forest Products Ltd.	372
Domtar Ltd.	1470
Fraser Companies Ltd.	223
Great Lakes Paper Co. Ltd., The	360
MacMillan, Bloedel Ltd.	2086
Price Co. Ltd., The	953

Printing and Publishing - (4)

Maclean-Hunter Ltd.	200
Moore Corp. Ltd.	2833
R.L. Crain Ltd.	128
Southam Press Ltd.	300

Primary Metals - (8)

Algoma Steel Corp. Ltd., The	1161
Alcan Aluminum Ltd.	3227
Canada Iron Foundries Ltd.	249
Dominion Foundries and Steel Ltd.	1544
Dominion Steel and Coal Corp. Ltd.	296
Interprovincial Steel and Pipe Corp. Ltd.	286
Slater Steel Industries Ltd.	246
Steel Co. of Canada Ltd., The	2433

Metal Fabrication - (9)

A.T.C.O. Industries Ltd.	253
C.A.E. Industries Ltd.	213
Dominion Bridge Co. Ltd.	259
E.M.C.O. Ltd.	125
Ford Motor Co. of Canada Ltd.	166
Hawker-Siddeley Canada Ltd.	812
Massey-Ferguson Ltd.	1813
M.L.W. Worthington Ltd.	80
Versatile Manufacturing Ltd. "A" Common	187

Table A-2 (Continued)

Non-Metallic Minerals - (4)

Canada Cement Co. Ltd.	240
Dominion Glass Co.	213
Lake Ontario Cement Ltd.	422
St. Lawrence Cement Co. "A"	60

Petroleums - (7)

Gulf Oil Canada Ltd.	2260
Home Oil Co. Ltd. "B"	257
Hudson's Bay Oil and Gas Co. Ltd.	1829
Husky Oil Canada Ltd.	939
Imperial Oil Ltd.	12792
Shell Canada Ltd.	2112
Texaco (Canada) Ltd.	972

Chemicals - (4)

Canadian Industries Ltd.	979
Chemcell Ltd.	1325
Du-Pont of Canada Ltd.	789
Union Carbide Canada Ltd.	1000

Construction - (4)

C.D.R.H.	67
Inspiration Ltd.	321
Revelstoke Building Materials Ltd.	60
Standard Paving and Materials Ltd.	102

Retail Trade - (7)

Dominion Stores Ltd.	807
Loblaw Cos. "B"	796
M. Loeb Ltd.	262
Metropolitan Stores of Canada Ltd.	85
Oshawa Wholesale Ltd.	541
Simpsons Ltd.	751
Woodward Stores Ltd.	469

Table A-2 (Continued)

Total Utilities (20)

Pipelines - (5)

Alberta Gas Trunk Line Co. Ltd. "A"	284
Interprovincial Pipe Line Co.	2544
Trans-Canada Pipe Lines Ltd.	824
Trans-Mountain Oil Pipe Line Co.	753
Westcoast Transmission Co. Ltd.	669

Transportation - (4)

Algoma Central Railway	325
Canada Steamship Lines Ltd.	259
Canadian Pacific Railway Co.	1433
Greyhound Lines of Canada Ltd.	464

Telephone - (3)

Bell Telephone Co. of Canada, The	3517
British Columbia Telephone Co.	259
Quebec Telephone	203

Electric Power - (3)

Calgary Power Ltd.	525
Newfoundland Light and Power Co. Ltd.	247
Nova Scotia Light and Power Co. Ltd.	496

Gas Distribution - (5)

Canadian Hydrocarbons Ltd.	212
Consumer Gas Co., The	2015
Northern and Central Gas Co. Ltd.	1144
Quebec Natural Gas Corp.	356
Union Gas Co. of Canada Ltd.	1503

Total Finance (14)

Banks - (6)

Bank of Montreal	3038
Bank of Nova Scotia, The	1500

Table A-2 (Continued)

Banks - (6) (Continued)	
Banque Canadienne Nationale	600
Canadian Imperial Bank of Commerce	3484
Royal Bank of Canada, The	3326
Toronto-Dominion Bank, The	1500
Investment and Loan - (8)	
Argus Corporation Ltd.	169
Canada Permanent Mortgage Corp.	710
Huron and Erie Mortgage Corp., The	454
Industrial Acceptance Corp. Ltd.	596
Investors Group "A", The	533
Power Corporation of Canada Ltd.	620
Traders Group Ltd. "A"	370
United Corp. Ltd. "B"	350

TABLE A-3

STOCK PRICE AVERAGE IN CONSTANT DOLLARS FOR THE TIME PERIOD

1935-1966

YEAR	STOCK PRICE AVERAGE
1935[1]	83.6
1936	108.9
1937	115.8
1938	94.9
1939	91.6
1940	77.4
1941	67.5
1942	64.2
1943	83.5
1944	83.8
1945	99.6
1946	115.7
1947	106.0
1948	112.5
1949	109.4
1950	131.6
1951	168.3
1952	173.1
1953	160.3
1954	181.2
1955	232.7
1956	269.0
1957	258.2
1958	239.4
1959	265.4
1960[2]	104.5
1961	132.7
1962	127.9
1963	136.7
1964	160.3
1965	176.2
1966	166.2

1. The base year for 1935 to 1959 is 1935-39=100

2. For the years 1960 to 1966, base year used is 1956=100

Source: Dominion Bureau of Statistics *Prices and Price Indexes,* (Ottawa: The Queen's Printers, 1936-1967) Catalogue No. 62-002

TABLE A-4

GNP FOR THE TIME PERIOD 1935-1966 IN CONSTANT DOLLARS

(1949=100)

(Millions of Dollars)

YEAR	GNP	YEAR	GNP
1935	7678	1950	17471
1936	8022	1951	18547
1937	8820	1952	20027
1938	8871	1953	20794
1939	9536	1954	20186
1940	10911	1955	21920
1941	12486	1956	23811
1942	14816	1957	24117
1943	15357	1958	24397
1944	15927	1959	25242
1945	15552	1960	25849
1946	15251	1961	26515
1947	15446	1962	28287
1948	15735	1963	29740
1949	16343	1964	31650
		1965	33814
		1966	35822

Source: Dominion Bureau of Statistics, *Canada Year Book* (Ottawa: The Queen's Printers, 1965 and 1968)

TABLE A-5

GNP′ FOR THE TIME PERIOD 1935-1966 IN CONSTANT DOLLARS

(1949=100)

(Millions of Dollars)

YEAR	GNP′ [1]	YEAR	GNP′
1935	7409	1950	16406
1936	7671	1951	17513
1937	8417	1952	18946
1938	8509	1953	19705
1939	8995	1954	19233
1940	10292	1955	20714
1941	11685	1956	22498
1942	13899	1957	22915
1943	15149	1958	23155
1944	15069	1959	23864
1945	14700	1960	24554
1946	14285	1961	25201
1947	14438	1962	26865
1948	14827	1963	28215
1949	15492	1964	29932
		1965	31978
		1966	34060

[1] GNP′ is GNP minus Corporate Profits Before Taxes

TABLE A-6

CORPORATE PROFITS BEFORE TAXES FOR THE TIME PERIOD 1935-1966

IN CURRENT DOLLARS

(Millions of Dollars)

YEAR	Corporate Profits Before Taxes	YEAR	Corporate Profits Before Taxes
1935	254	1950	2250
1936	340	1951	2484
1937	434	1952	2442
1938	370	1953	2404
1939	537	1954	2069
1940	669	1955	2640
1941	932	1956	2963
1942	1128	1957	2734
1943	1128	1958	2829
1944	1120	1959	3178
1945	1125	1960	2990
1946	1342	1961	3066
1947	1646	1962	3413
1948	1757	1963	3730
1949	1688	1964	4215
		1965	4597
		1966	4575

Source: Dominion Bureau of Statistics. Canadian Statistical Review (Ottawa: The Queen's Printers, 1936-1967) Catalogue No. 11-003

TABLE A-7

CORPORATE DIVIDENDS FOR THE TIME PERIOD 1935 - 1966

IN CURRENT DOLLARS

(Millions of Dollars)

YEAR	Corporate Dividends	YEAR	Corporate Dividends
1935	204	1950	762
1936	243	1951	720
1937	269	1952	669
1938	296	1953	634
1939	302	1954	611
1940	342	1955	702
1941	318	1956	767
1942	299	1957	829
1943	298	1958	846
1944	276	1959	894
1945	257	1960	917
1946	320	1961	1018
1947	467	1962	1128
1948	465	1963	1251
1949	551	1964	1430
		1965	1576
		1966	1700

Source: Dominion Bureau of Statistics. Canadian Statistical Review (Ottawa: The Queen's Printers, 1936-1967) Catalogue No. 11-003

TABLE A-8

STOCK PRICE AVERAGE FOR THE TIME PERIOD 1935-1966

IN CONSTANT DOLLARS

(1949 = 100)

YEAR	STOCK PRICE AVERAGE	YEAR	STOCK PRICE AVERAGE
1935	76.4	1950	120.3
1936	99.5	1951	153.8
1937	105.9	1952	158.2
1938	86.7	1953	146.5
1939	83.7	1954	165.6
1940	70.7	1955	212.7
1941	61.7	1956	245.9
1942	58.7	1957	236.0
1943	76.3	1958	218.8
1944	76.6	1959	242.6
1945	91.0	1960	256.9
1946	105.8	1961	326.1
1947	96.8	1962	314.4
1948	102.8	1963	336.0
1949	100.0	1964	394.0
		1965	433.1
		1966	408.5

TABLE A-9

CORPORATE PROFITS BEFORE TAXES FOR THE TIME PERIOD 1935-1966 IN CONSTANT DOLLARS

1935-39=100 [1]

(Millions of Dollars)

YEAR	Corporate Profits Before Taxes	YEAR	Corporate Profits Before Taxes
1935	269	1950	1065
1936	351	1951	1034
1937	403	1952	1081
1938	362	1953	1089
1939	541	1954	953
1940	619	1955	1206
1941	801	1956	1313
1942	917	1957	1202
1943	882	1958	1242
1944	858	1959	1378
1945	852	1960	1295
1946	966	1961	1314
1947	1008	1962	1422
1948	908	1963	1525
1949	851	1964	1718
		1965	1836
		1966	1762

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1. Converted from current dollars to constant dollars using wholesale Price Index.

TABLE A-10

DIVIDENDS FOR THE TIME PERIOD 1935-1966

IN CONSTANT DOLLARS

1935-39 = 100[1]

(Millions of Dollars)

YEAR	Corporate Dividends	YEAR	Corporate Dividends
1935	216	1950	361
1936	251	1951	300
1937	250	1952	296
1938	290	1953	287
1939	304	1954	282
1940	317	1955	321
1941	273	1956	340
1942	243	1957	364
1943	233	1958	371
1944	211	1959	388
1945	195	1960	397
1946	230	1961	436
1947	286	1962	470
1948	240	1963	511
1949	278	1964	583
		1965	629
		1966	655

1. Converted from current dollars to constant dollars using wholesale Price Index.

TABLE A-11

DIVIDEND PAYOUT RATIO FOR THE TIME PERIOD 1935-1966

YEAR	Dividend Payout Ratio	YEAR	Dividend Payout Ratio
1935	80	1950	34
1936	72	1951	29
1937	62	1952	27
1938	80	1953	26
1939	56	1954	30
1940	51	1955	27
1941	34	1956	26
1942	26	1957	30
1943	26	1958	30
1944	25	1959	28
1945	23	1960	31
1946	24	1961	33
1947	28	1962	33
1948	26	1963	34
1949	33	1964	34
		1965	34
		1966	37

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